

501.33745CX4/219400807US5

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Shunji MAEDA *et al.*  
Appl'n No. : 10/686,584  
Filed : 17 October 2003  
For : MANUFACTURING METHOD OF SEMICONDUCTOR.....  
SUBSTRATE AND METHOD AND APPARATUS FOR  
INSPECTING DEFECTS OF PATTERNS...  
Art Unit : 2877  
Examiner : Hoa Q. Pham  
Conf. No : 9360

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AMENDMENT, REQUEST FOR  
EXAMINER INTERVIEW AND REQUEST FOR REFUND

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

25 May 2005

Sir:

Responsive to the 25 February 2005 Office Action, the following amendments and remarks are respectfully submitted.

In accordance with the revised format of the manner of making amendments under 37 CFR §1.121 as set forth in the Final Rule effective 30 July 2003, each section of amendment herein begins on a new page, and changes are shown by strike-through (or double brackets where appropriate) and underlining to indicate deletions and additions, respectively. A complete listing of all claims ever presented in the application is given with the current status of each claim, and only the text of all pending and withdrawn claims is presented in full, with those not being amended herein being presented in clean version.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 2

**IN THE SPECIFICATION:**

For the paragraph inserted on page 1, between lines 3 (the last line of the title) and 4 (the first section heading) of Applicant's specification by the 17 October 2003 Preliminary Amendment, please enter the following replacement paragraph.

**CROSS-REFERENCE TO RELATED APPLICATIONS**

This is a continuation of Appln. No. ~~40/097,478~~10/098,478 filed 18 March 2002, pending, which is a continuation of Appln. No. 09/588,201 filed 6 June 2000, now US 6,404,498 B1, which is a continuation of Appln. No. 09/107,432 filed 30 June 1998, now US 6,263,099, which is a continuation of Appln. No. 08/539,886 filed 6 October 1995, now US 5,774,222.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 3

**IN THE CLAIMS:**

1.-42. (Canceled)

43. (Currently Amended) A method of inspecting a patterned wafer, comprising:

- emitting light containing a plurality of wavelengths from a light source;
- illuminating the patterned wafer with the light focused substantially on a pupil of an objective lens to illuminate the patterned wafer through a lens;
- detecting through the lens with a sensor, an image of a pattern on the patterned wafer as illuminated by the light, and outputting from the sensor, a signal concerning a detected image; and
- processing the signal outputted from the sensor and obtaining information of defects of the pattern;
- wherein light components having a predetermined wavelength range are selected from the light emitted from the light source for preventing interference of lights reflected from the wafer by the illuminating, and are used to illuminate the patterned wafer.

44. (Previously Presented) A method according to the Claim 43, wherein in the detecting, the image of the pattern is detected by a time delay integration sensor.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 4

45. (Previously Presented) A method according to the Claim 43, wherein in the illuminating, the patterned wafer is illuminated with ultra violet light selected from the light emitted from the light source.

46. (Previously Presented) A method according to the Claim 43, wherein in the illuminating, a wavelength selection filter selects the light components having a predetermined wavelength range of 600 nm or under from the light emitted from the light source.

47. (Currently Amended) A method of inspecting a patterned wafer, comprising:

illuminating a specimen through an objective lens with light focused substantially on a pupil of the objective lens, and with wavelength ~~the~~ light having a predetermined wavelength range as selected from light having a plural wavelengths emitted from a light source for preventing interference of lights reflected from the wafer by the illuminating;

detecting with a time delay integration sensor, a light reflected from the patterned wafer by the wavelength light and passed through the objective lens; and

processing the output signal from the time delay integration sensor and obtaining information relating to a defect of the patterned wafer.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 5

48. (Previously Presented) A method according to the Claim 47, wherein in the illuminating, the patterned wafer is illuminated with ultra violet light selected from the light emitted from the light source.

49. (Previously Presented) A method according to the Claim 48, wherein the time delay integration sensor outputs signals in parallel, and the signals outputted in parallel are processed in parallel in the processing operation.

50. (Previously Presented) A method according to the Claim 47, wherein in the processing, the output signal from the time delay integration sensor is processed using a variable defect detection sensitivity which varies according to a position on the patterned wafer.

51. (Previously Presented) A method according to the Claim 47, wherein in the processing, the output signal from the time delay integration sensor is processed using a variable defect detection sensitivity which varies according to the pattern being inspected.

52. (Currently Amended) An apparatus for inspecting a patterned wafer, comprising:

a light source to emit light containing a plurality of wavelengths;

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 6

an illuminating unit to illuminate the patterned wafer with light emitted from the light source, where the light is focused substantially on a pupil of an objective lens to illuminate the patterned wafer;

a detecting unit to detect an image of a pattern on the patterned wafer as illuminated by the illuminating unit, and to output a signal concerning a detected image; and

a processing unit to process the signal outputted from the detecting unit and to obtain information of defects of the pattern;

wherein, the illuminating unit selects predetermined light components having a predetermined wavelength range from the light emitted from the light source for preventing interference of lights reflected from the wafer by the illuminating, to illuminate the patterned wafer.

53. (Previously Presented) An apparatus according to the Claim 52, wherein the detecting unit detects the image of the pattern with a time delay integration sensor.

54. (Previously Presented) An apparatus according to the Claim 52, wherein the light source emits ultra violet light, and the illuminating unit selects the ultra violet light from the light emitted from the light source as the predetermined light components having a predetermined wavelength range.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 7

55. (Previously Presented) An apparatus according to the Claim 52, wherein the light source is a lamp.

56. (Previously Presented) An apparatus according to the Claim 52, wherein the processing unit processes the signal outputted from the detecting unit with a variable defect detection sensitivity which varies according to a position on the patterned wafer.

57. (Previously Presented) An apparatus according to the Claim 52, wherein the processing unit processes the signal outputted from the detecting unit with a variable defect detection sensitivity which varies according to the pattern being inspected.

58. (Currently Amended) An apparatus for inspecting a patterned wafer, comprising:

a light source to emit light containing plural wavelengths;

an illuminating unit having an objective lens to illuminate the patterned wafer through the objective lens with wavelength light, where the light is focused substantially on a pupil of the objective lens and having a predetermined wavelength range as selected from the light emitted from the light source for preventing interference of lights reflected from the wafer by the illuminating;

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 8

a detecting unit to detect an image of the patterned wafer as illuminated by the illuminating unit through the objective lens, with a time delay integration sensor; and

a processing unit to process an output signal from the time delay integration sensor and to obtain information relating to a defect of the patterned wafer.

59. (Previously Presented) An apparatus according to the Claim 58, wherein the light source emits ultra violet light, and the illuminating unit selects the ultra violet light from the light emitted from the light source, to illuminate the patterned wafer.

60. (Previously Presented) An apparatus according to the Claim 58, wherein the illuminating unit includes a wavelength selection filter to select light components having a predetermined wavelength range of 600 nm or under from the light emitted from the light source, to illuminate the patterned wafer.

61. (Previously Presented) An apparatus according to the Claim 58, wherein the processing unit processes the signal outputted from the detecting unit with a variable defect detection sensitivity which varies according to a position on the patterned wafer.

62. (Previously Presented) An apparatus according to the Claim 58, wherein the processing unit processes the signal outputted from the detecting unit with a



MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 9

variable defect detection sensitivity which varies according to the pattern being inspected.

63. (Previously Presented) A method according to Claim 47, wherein a wavelength selection filter for selecting wavelengths from the light is disposed between the light source and the objective lens.

64. (Previously Presented) A method according to Claim 47, wherein a wavelength selection filter for selecting the wavelength light is disposed between the light source and the objective lens.

65. (Previously Presented) An apparatus according to Claim 52, comprising a wavelength selection filter disposed between the light source and the objective lens selects the predetermined light components.

66. (Previously Presented) An apparatus according to Claim 58, comprising a wavelength selection filter disposed between the light source and the objective lens selects the wavelength light.

67. (Currently Amended) An apparatus for inspecting a patterned wafer, comprising:

a light source to emit light containing a plurality of wavelengths;

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 10

a non-interference light selector including a filter to select predetermined wavelengths from the light emitted from the light source for preventing interference of lights reflected from the wafer, to illuminate the patterned wafer;

an optical unit having plural lenses to form an optical path of the light emitted from the light source, including an objective lens to pass the light having  
predetermined wavelengths from the non-interference light selector to the patterned wafer;

a detecting unit to detect an image of a pattern on the patterned wafer as illuminated by the predetermined wavelengths and reflected back through the objective lens, and to output a signal concerning a detected image; and

a processing unit to process the signal outputted from the detecting unit and to obtain information of defects of the pattern;

wherein the optical unit focuses the light substantially on a pupil of the objective lens and illuminates the patterned wafer through the objective lens.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 11

### REMARKS

This paper is responsive to the Office Action identified above, and is responsive in any other manner indicated below.

### PROTEST OF LACK OF EXAMINATION

Applicant respectfully protests the lack of proper handling of the Petition To Make Special For Special Accelerated Examination Under MPEP §708.02(VII) formally filed on 29 April 2005, and the lack of acknowledgment and/or action taken upon filing of the Petition.

It is noted that the complete Petition and all concomitant filings (attachments to Petition, Supplemental Preliminary Amendment, fees, etc.) appear in electronic format in both the Image File Wrapper and Transaction History sections of PAIR on the original 29 April 2004 date of filing. Accordingly, Applicant does not believe it is necessary to submit an additional copies herewith.

### REQUEST FOR REFUND

In view of the fact that the Office has not acted upon the Petition to Make Special filed 29 April 2004, Applicant respectfully requests immediate refund of the Petition fee of \$130 to ATSK Deposit Account No. 01-2135.

### PAPER(S) MISSED AND/OR NOT ADEQUATELY TREATED IN OFFICE ACTION

The Office Action missed and/or did not adequately treat Applicant's Supplemental Preliminary Amendment filed 29 April 2004. It is noted that the

MAEDA et al., SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 12

complete Preliminary Amendment and all concomitant filings appear electronically in PAIR, in both the Image File Wrapper and Transaction History sections, and the date of entry for such papers is the original date of filing. Accordingly, Applicant does not submit additional copies herewith.

It also is respectfully submitted that objections/rejections within the Office Action are erroneous in that they fail to consider Applicant's claims as amended and/or presented within such Supplemental Preliminary Amendment, and accordingly, it is respectfully submitted that the Office Action and any objections/rejections therein should be withdrawn. Regarding the missed and untreated paper, it is respectfully requested that any further Action regarding the present application fully treat and consider such paper.

#### REQUEST FOR EXAMINER INTERVIEW BEFORE FURTHER ACTION

In the interest of expediting prosecution of the present application, Applicant respectfully requests that an Examiner Interview be scheduled and conducted before any further Action is issued with respect to the present application. The Examiner is respectfully requested to contact the attorney indicated on this paper at the local D.C. area telephone number of 703-312-6600 for the purpose of scheduling an examiner interview. The Examiner is thanked in advance for such considerations. Contact will also be attempted by the undersigned attorney to schedule an Examiner Interview. In the event that the present papers, in and of themselves, are sufficient to place the application in condition for allowance, no Examiner Interview would be necessary.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 13

#### **FOREIGN REPRESENTATIVES ATTENDANCE AT EXAMINER INTERVIEW**

At least one of the inventors and/or Applicant's foreign (Japanese) representatives would like to travel from Japan during August/September 2005 to also participate in the requested Examiner Interview. Accordingly, in view of the substantial time and expense of traveling from Japan, cooperation by the Examiner to accommodate Applicant's foreign representatives' schedule, and cooperation by the Examiner to maintain and conduct the Interview on any agreed-upon Interview date, would be greatly appreciated.

#### **IDENTIFICATION OF EARLIER FILED APPLICATION - CORRECTED**

Regarding the objection to the disclosure as set forth within the section numbered "2" on page 2 of the Office Action, the disclosure has herein been amended to correct the serial number regarding reference to earlier-filed application(s). The Examiner is respectfully thanked for his assistance in pointing out such error.

#### **PENDING CLAIMS**

Claims 43-67 were pending, under consideration and subjected to examination in the Office Action. Appropriate claims have been amended and added herein to adjust a clarity and/or focus of Applicant's claimed invention. That is, such changes are unrelated to any prior art or scope adjustment, and are simply refocused claims in which Applicant is present interested. At entry of this paper, Claims 43-67 are pending for consideration and examination in the application.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 14

**CLAIM(S) MISSED AND/OR NOT ADEQUATELY TREATED IN OFFICE ACTION**

The main body of the Office Action comments missed and/or did not adequately treat at least Claims 63-67, submitted in the 29 April Supplemental Preliminary Amendment. Accordingly, it is respectfully requested that any further Action regarding the present application fully treat such claims. Further, at this point, it is respectfully submitted as a reminder that, if new art is now cited against any of Applicant's untreated claims, then it would not be proper to make a next Action final.

**ALL REJECTIONS UNDER 35 USC §§102 AND 103 - TRAVERSED**

All 35 USC rejections based upon Chadwick *et al.* (5,085,517) are respectfully traversed, in that the 25 February 2005 Office Action and the objections/rejections contained therein, did not consider the claims as effected by Applicant's 29 April 2004 Supplemental Preliminary Amendment. While traversal arguments beyond the above are not needed, Applicant, however, respectfully submits the following to preclude renewal of any such rejections against Applicant's clarified claims.

All descriptions of Applicant's disclosed and claimed invention, and all descriptions and rebuttal arguments regarding the applied prior art, as previously submitted by Applicant in any form, are repeated and incorporated herein by reference. Further, all Office Action statements regarding the prior art rejections are respectfully traversed. As additional arguments, Applicant respectfully submits the following.

In order to properly support a §102 anticipatory-type rejection, any applied art reference must disclose each and every limitation of any rejected claim. The applied

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 15

art does not adequately support a §102 anticipatory-type rejection because, at minimum, such applied art does not disclose (or suggest) the following discussed limitations of Applicant's claims.

At minimum, Applicant's present claims contain a feature/limitations that the light illuminating a pattern is focused on a pupil of an objective lens. Such is so-called Koehler-type illumination. Such feature/limitations is supported at least by Applicant's specification page 17, lines 2-10 and page 21, line 13.

In contrast, Chadwick *et al.* discloses a lens which passes illuminating light and reflection light such as 906' in FIG. 12 and 334 in FIG. 28, but Chadwick *et al.*'s Column 22, lines 52-60 discloses using the objective lens 334 with a critical-type illumination system. Critical illumination is different from Applicant's Koehler illumination, in that critical illumination does not focus light on a pupil of an objective lens.

As a result of all of the foregoing, it is respectfully submitted that the applied art would not support a §102 anticipatory-type rejection or §103 obviousness-type rejection of Applicant's claims. Accordingly, reconsideration and withdrawal of such §§102 and 103 rejections, and express written allowance of all of the rejected claims, are respectfully requested.

#### RESERVATION OF RIGHTS

It is respectfully submitted that any and all claim amendments and/or cancellations submitted within this paper and throughout prosecution of the present application are without prejudice or disclaimer of any scope or subject matter.

MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 16

Further, Applicant respectfully reserves all rights to file subsequent related application(s) (including reissue applications) directed to any/all previously claimed limitations/features which have been subsequently amended or cancelled, or to any/all limitations/features not yet claimed, *i.e.*, Applicant continues (indefinitely) to maintain no intention or desire to dedicate or surrender any limitations/features of subject matter of the present application to the public.

#### EXAMINER INVITED TO TELEPHONE

The Examiner is invited to telephone the undersigned at the local D.C. area number of 703-312-6600, to discuss an Examiner's Amendment or other suggested action for accelerating prosecution and moving the present application to allowance.

#### CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that the claims listed above as presently being under consideration in the application are in condition for allowance. Accordingly, early allowance of such claims is respectfully requested.

This Amendment is being submitted within the shortened statutory period for response to the Office Action mailed 25 February 2005, and accordingly, no Petition or extension fee is required for entry of this Amendment. To whatever other extent is actually required, Applicant respectfully petitions for an extension of time under 37 CFR §1.136. All claim fees required by entry of the Supplemental Preliminary Amendment filed 29 April 2004 were previously paid with such paper, and no

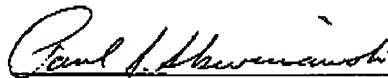


MAEDA *et al.*, SN 10/686,584  
Amdt. filed 25 May 2005  
Responsive to 25 February 2005 OA

Dkt. 501.33745CX4/219400807US5  
Page 17

additional claim fees are required for entry of this Amendment. Please charge any actual and appropriate deficiency in fees to Deposit Account No. 01-2135 (as Case No. 501.33745CX4), and please credit any refund of fees to such Deposit Account.

Respectfully submitted,



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